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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SONG, MATTHEW J

ART UNIT

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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/555,853	Applicant(s) OHAMA, YASUO	
	Examiner MATTHEW J. SONG	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29,31 and 33-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 35-43 is/are allowed.
- 6) ☒ Claim(s) 29,31,33 and 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 29 recites the limitation "the transparent layer made of a synthetic quartz glass with a thickness of 0.2 mm or less" in lines 13-14. There is insufficient antecedent basis for this limitation in the claim. There is support for a transparent layer with a thickness of 0.2 to 1.5 mm.
3. Claim 31 recites the limitation "the transparent layer made of natural quartz" in line 5. There is insufficient antecedent basis for this limitation in the claim. Claim 31 depends from claim 29 and claim 29 recites a transparent layer made of synthetic quartz on the inner surface of the crucible in the range of 0.6 to 1.0 L. There is no support for a natural quartz layer.
4. Claim 31 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 31 depends from claim 29 and claim 29 recites a transparent layer made of synthetic quartz on the inner surface of the crucible in the range of 0.6 to 1.0 L. It is unclear whether the layer is intended to be natural or synthetic quartz or if there is an additional layer formed. For the purposes of expediting examination, the layer is interpreted as a synthetic quartz layer because claim 31 recites "the transparent layer" which suggests the layer defined in claim 29.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 29, 31, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kemmochi et al (US 2003/0012899) in view of Sato et al (US 6,136,092) and Ohama (US 2002/0192409 A1).

Referring to claim 29, Kemmochi et al teaches a quartz crucible comprising an outer layer formed by melting natural silica powder (pure quartz grain such as natural silica) ([0047] and [0051]); a first transparent layer **18** made of natural quartz formed on the inside thereof (Fig 3, [0035]-[0036]); and a second transparent layer **16** made of synthetic quartz glass formed over the entire inside surface, which clearly suggests a transparent layer formed on the inside of the crucible from 0-1.0 L (Fig 1 shows a transparent layer 16 over the entire inside surface; Fig 3; [0035]-[0036]). Kemmochi et al teaches a transparent layer from 0-1.0L, thus comprises at least 0.15-0.55L and 0.6 to 1.0 L. Kemmochi et al also teaches forming a transparent transition layer **18** made of natural quartz ([0036], [0040], [0059] and Fig 3), which clearly suggests a transparent layer made of natural quartz. Kemmochi et al teaches an inner layer **16** of transparent synthetic quartz formed on the entire surface of the crucible (Fig 1 and [0035], [0051] and [0054]), which clearly suggests a transparent synthetic layer covering 0-1 L. Kemmochi et al also

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teaches inner layer **16** with a thickness of 0.2-1.0 mm, which clearly suggests a thickness 0.2 mm from 0-1L because overlapping ranges are prima facie obvious (MPEP 2144.05).

Kemmochi et al teaches an outer translucent silica glass layer ([0030]). Kemmochi et al does not teach an opaque outer layer.

In a method of forming a quartz crucible, note entire reference, Sato et al teaches an opaque outer layer and a transparent inner layer (col 3, ln 30-40).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kemmochi et al by using an opaque outer layer, as taught by Sato et al, because an opaque outer layer has a higher strength (Sato col 1, ln 40-50).

The combination of Kemmochi et al and Sato et al does not explicitly teach the natural quartz transparent layer has a thickness of 0.4-5.0 mm. The combination of Kemmochi et al and Sato et al teaches a side portion has a thickness of 10.0 mm with an inner layer of 0.2-1.0 mm and a bulk layer of 6.5-9.4 mm, thus a first transparent layer having a thickness within the range 0.4-5.0 mm can be inferred based on a total thickness of 10.0 mm ('899 [0031] and [0038]), for example a bulk layer thickness of 6.5 mm with an inner layer thickness of 0.2 mm would suggest a thickness of 3.3 mm for the first transparent layer. Furthermore, Ohama et al teaches a quartz crucible comprising a translucent outer layer of quartz, a transparent inner layer and an intermediate layer ([0013]-[0016]). Ohama et al also teaches the thickness of the intermediate layer of 0.5 mm or more ([0023]).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kemmochi et al and Sato et al by using an intermediate

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layer of 0.5 mm or more, as taught by Ohama et al, to provide a crucible with sufficient strength to the crucible ([0019]).

Referring to claim 31, the combination of Kemmochi et al, Sato et al, and Ohama et al teaches forming a transparent inner layer **16** over the entire inner surface which suggests 0-1.0 L, as discussed previously, which clearly suggests an inner surface from 0.6 to 1.0 L is made of transparent quartz glass. The combination of Kemmochi et al, Sato et al, and Ohama et al also teaches the inner layer **16** is formed by introduction of inner silica grain, such as natural silica (natural quartz glass), or alternatively synthetic silica grain (Kemmochi [0051] and [0054]), thus the selection of natural quartz glass is suggested by Kemmochi et al.

Referring to claim 33, the combination of Kemmochi et al, Sato et al, and Ohama et al teaches an opaque silica with an OH group concentration of 80 ppm or less (Sato col 3, ln 55-67), which overlaps the range of 20 to 60 ppm for the outer layer. The combination of Kemmochi et al, Sato et al, and Ohama et al also teaches an inner layer with an OH concentration of 100-400 ppm to a depth of 1 mm, with an inner layer thickness of 0.5 mm ('409 [0023]), which suggests an intermediate layer OH concentration of 100-400 ppm for the intermediate layer because the OH range of 100-400 ppm extends to a depth of 1 mm and the inner layer thickness is only 0.5 mm, thus the range of 100-400 ppm includes the intermediate layer. It is noted overlapping ranges are prima facie obvious (MPEP 2144.05). In regards to the relation limitation, $C_A > C_B > C_C$, the combination of Kemmochi et al, Sato et al, and Ohama et al teaches a C_A of 20 to 60 ppm and a C_C and C_B of 100-400ppm, thus $C_A > C_C$ and $C_B > C_C$. The combination of Kemmochi et al, Sato et al, and Ohama et al does not explicitly teach the relationship of C_B to C_C is $C_B > C_C$. It would have been obvious to a person of ordinary skill in the

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art at the time of the invention to modify the combination of Kemmochi et al, Sato et al, and Ohama et al to have the claimed relationship of $C_B > C_C$, because the combination of Kemmochi et al, Sato et al, and Ohama et al teaches ranges of OH concentration and selection of OH concentrations within with range taught would have been obvious, and nominal differences in concentration such as a C_B of 100 ppm and a C_C of 99.99 ppm, would have been obvious one skilled in the art.

Referring to claim 34, the combination of Kemmochi et al, Sato et al, and Ohama et al teaches forming a crucible with an opaque outer layer, a transparent natural quartz layer and a transparent inner quartz layer formed on at least 0.15 to 0.55 L, as discussed previously in regards to claim 29. The combination of Kemmochi et al, Sato et al, and Ohama et al also teaches feeding silica powder into a rotating mold to form the crucible body, feeding natural silica grain which is partially melted and fused to the body and then feeding inner silica grain (See Kemmochi [0055]-[0059] in regards to the method of forming a bulk layer, transition layer and inner layer).

Allowable Subject Matter

7. Claims 35-43 are allowed.

Response to Arguments

8. Applicant's arguments with respect to claims 29, 31, 33 and 34 have been considered but are moot in view of the new ground(s) of rejection.

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9. Applicant's arguments filed 10/27/2009 have been fully considered but they are not persuasive.

Applicant's argument that the prior art does not teach a transparent layer made of synthetic quartz with a thickness of 0.2 to 1.5 mm on an inside of the crucible in a range from at least 0.15 to 0.55 L is noted but not found persuasive. Kemmochi et al teaches a transparent inner layer **16** made of synthetic quartz with a thickness of 0.2-1.0 mm, which covers the entire inner surface of the crucible, i.e. 0-1 L ('899 Fig 1 and [0035], [0038], [0051], and [0054]), which clearly suggests a thickness of 0.2 mm to 1.5 mm because overlapping ranges are prima facie obvious (MPEP 2144.05).

Applicant's argument that the prior art does not teach a transparent layer made of synthetic quartz with a thickness of 0.2 or less on an inside of the crucible in a range from 0.6 to 1.0 L is noted but not found persuasive. Kemmochi et al teaches a transparent inner layer **16** made of synthetic quartz with a thickness of 0.2-1.0 mm, which covers the entire inner surface of the crucible, i.e. 0-1 L ('899 Fig 1 and [0035], [0038], [0051], and [0054]), which clearly suggests a thickness of 0.2 mm or less because overlapping ranges are prima facie obvious (MPEP 2144.05).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS
January 16, 2010

/Robert M Kunemund/

Primary Examiner, Art Unit 1792